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The Mössbauer Effect

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B025/B056

$$\ln f = - \frac{E^2}{2\pi^2 M c^2 k^2} \int_0^{\infty} C_L(T) \frac{dT}{T^2}$$

The second section of the revised article deals with the influence exerted by the quadratic Doppler effect; here, it is shown that the dependence of the Mössbauer frequency on the temperature of the radiation source or of the absorber leads to terms with  $\frac{v^2}{c^2}$  where  $v$  is the velocity of thermal motion. The formula by Pound and Rebka (Phys.Rev.Lett., 1960, Vol. 4, p. 274) is derived and discussed. In the third section, the effect of impurities, which is usually low, is investigated. Such an effect of foreign atoms exists only at high frequencies, and the contribution to the mean displacement square is found to be insignificant. (The experimental verification of these statements is still lacking). In order to investigate coherence effects (fourth section), M. I. Podgoretskiy and I. D. Royzen (Ref. 13) investigated the radiation of a diatomic molecule

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and of a long chain of atoms by classical methods, for it must be expected that a transfer of excitation between nuclei of the same type is possible. In the fifth section, the author discusses the problem dealt with by M. I. Podgoretskiy and A. V. Stepanov (Ref. 14) as to whether the Mössbauer effect may occur also in gases and liquids, for the local displacement of a diffusing atom is, after all, very small within the lifetime of the excited nucleus. It was, however, found that the spectral width is smaller than the Doppler shift. In liquid lead, for instance, the diffusion coefficient is  $10^{-5} \text{ cm}^2/\text{sec}$ , so that from  $\frac{hD}{\lambda^2}$  an additional width

of  $10^{-3}$  ev results for 10 kev, which is large compared to the natural line width. In the sixth section of the revised article, experiments with  $\text{Sn}^{119}$  are discussed, which were carried out by A. I. Alikhanov, V. A. Lyubimov, I. Ya. Barit et al., N. N. Delyagin, and V. S. Shpinel' et al. (Effect of the magnetic field upon absorption, cf. Fig. 1). These experiments were carried out at room temperature and at the temperature

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of liquid nitrogen, the radiation source being located in the magnetic field and the absorber ( $5 \text{ mg/cm}^2$ , natural Sn) outside the field. It was further found that the line broadening is twice as great as the natural line width, and that such a broadening changes the magnetic moment of the excited level from -0.25 to 1.0 nuclear magnetons. The last section deals with the possibility of discovering the resonance absorption of  $\text{Zn}^{67}$ . Experiments hitherto carried out at the temperature of liquid helium gave a negative result. Byrgov and Davydov investigated the possibility of observing the Mössbauer effect in the isotope  $\text{Ag}^{107}$ . Further interesting possibilities of obtaining still narrower resonance lines are discussed. There are 5 figures and 27 references: 15 Soviet, 3 German, 7 US, and 2 French.

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ALFIMENKOV, V.P.; OSTANEVICH, Yu.M.; RUSKOV, T.; STRELKOV, A.V.;  
SHAPIRO, F.; YAN' U-GUAN [Yen Wu-kuang]

[Observation of the Mossbauer effect in  $\text{Sm}^{149}$ ] Nabliudenie ef-  
fekta Messbauera  $\text{Sm}^{149}$ . Dubna, Ob"edinennyi in-t iadernykh issl.,  
1961. 6 p. (MIRA 15:1)  
(Nuclear magnetic resonance and relaxation) (Samarium)

ALFIMENKOV, V.P.; OSTANEVICH, Yu.M.; RUSKOV, T.; STRELKOV, A.V.;  
SHAPIRO, F.; YAN' U-GUAN [Yen Wu-kuang]

[Energy spectrum of the resonance absorption of  $\gamma$ -radiation  
from 92 Kev.  $Zn^{67}$  in zinc oxide] Energeticheskij spektr rezonan-  
snogo pogloshcheniia  $\gamma$ -islucheniia 92 Kev  $Zn^{67}$  v okisi tsinka.  
Dubna, Ob"edinennyi in-t iadernykh issl., 1961. 16 p.

(MIRA 15:1)

(Gamma rays)

(Zinc oxide)

CHERNOMIR, P. D., YAKOVLEV, Y. S., LITVINOV, D. I., BLYUD, G. R.,  
MURZIN, Y. A., KORDAKOV, I. I., DEMIDOV, S. I., ZAKHAROV, A. S.,  
KOROTKOV, A. P., KAZACHOVSKIY, G. D., PRALYANOV, S. I., LEPIKOV, A. I.,  
ALEX, I. A., KAZAROV, P. N., KUKOLACH, S. K., ZATSCHEV, Y. I.,  
KRAVCHENKO, Y. I., PRAT, I. I.

"A Pulse fast reactor."

report submitted for the IAEA seminar on the Physics of Fast and  
Intermediate Reactors, Vienna, 3-11 Aug 1961.

Acad Sci. USSR Moscow

33084

S/638/61/001/000/006/056

B102/B138

24.6600

AUTHORS:

Isakov, A. I., Popov, Yu. P., Shapiro, F. L.

TITLE:

Measurement of the energy dependence of radiative capture of neutrons in the energy range up to 30 kev

SOURCE:

Tashkentskaya konferentsiya po mirnomy ispol'zovaniyu atomnoy energii. Tashkent, 1959. Trudy. v. 1. Tashkent, 1961, 64-72

TEXT: The energy dependence of radiative neutron capture cross sections of Cl, Fe, Ag, and Au was determined spectrometrically from the slowing-down times of the neutrons in lead and preliminary data obtained for Rh, Cu, and Ni. The spectrometer was a 2-m cube in the center of which neutron outbursts from D-T reactions took place 625 times per second, lasting 0.5-2  $\mu$ sec each. At each moment of time  $t$  after the outburst, the neutrons slowed down in lead had a mean energy of  $E = 183/(t + 0.3)^2$  kev;  $t$  in  $\mu$ sec. The root mean square deviate from this value by  $\sim 15\%$  with  $E < 1$  kev and by  $\sim 30\%$  with  $E = 10$  kev. The mean neutron capture cross section at energy  $E$  is given by

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$\sigma(n, \gamma) = k \frac{I}{I_{Li}} (t) \cdot (t + 0.3)$  where  $I_{\gamma}$  is the counting rate in the analyzer channel and  $I_{Li}$  the counting rate in the detector channel for neutron capture according to the  $1/v$ -law.  $k$  is a scaling factor. Results: Cl. For  $E_0 = 88$  kev no peak was observed. The observed deviation from the  $1/v$ -law at small energies is attributed to a  $Cl^{36}$  level below the neutron bond energy whose energy was found to be  $E_0 = -20 \pm 10$  ev. Brugger et al. obtained  $E_0 = -140 \pm 5$ . From the possible values of the statistical  $g$ -factor the level energies were taken to be 405 ev and 4.3 kev. The latter is attributed to  $Cl^{36}$ . Both seem to be p-levels for which

$E_0$	$\left(\frac{2\pi R}{\lambda}\right)^2$	$\frac{\Gamma_n^0}{\Gamma_n^0(-210 \text{ ev})}$
405 ev	$0.4 \cdot 10^{-3}$	$(0.7-7) \cdot 10^{-3}$
4.3 kev	$5 \cdot 10^{-3}$	$(2.4-20) \cdot 10^{-3}$ , is valid.

Fe and Ni.  $\sigma(n, \gamma)$  of armco iron shows some irregular peaks which are

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Measurement of the energy ...

attributed to Mo, Co, and Mn impurities. The authors were the first to observe the Fe level at  $E_0 = 1180 \pm 80$  ev. If this peak is due to a single level then  $\Gamma_\gamma \lesssim 0.8$  ev irrespective of the isotope to which the level belongs. The total resonance integral was found to be  $R_\gamma = 1.22 \pm 0.04$  b;  $R_\gamma(1/v) = 1.1 \pm 0.03$  b, the contribution of the 1180-ev level is  $0.1 \pm 0.01$  b and that of the higher levels is 0.02 b. In nickel another resonance at approximately 2 kev was observed besides the known resonance at  $E_0 = 4.2$  kev. A rough estimate of the resonance integral gives  $\sim 0.1$  b, which is not in agreement with the results obtained by other authors. Ag and Au. For  $E \leq 1$  kev the sample thickness (0.2 and 0.6 mm) influences the results, due to blocking effect. The values for Ag differ from those of the neutron atlas (Second Edition BNL-1958). Au. For  $E < 10$  kev they correspond to the tabulated values, for  $E < 10$  kev the values were by 30-40% higher.  $(\Gamma_n^0/D) = (1.2 \pm 0.3) \cdot 10^{-4}$  is close to the value given in the atlas. Rh. The parameters of the levels with  $E_0 = 1.257$  ev and  $E_n = 46.5$  ev agree with the tabulated values, the other levels were not resolved. Cu. For  $E < 100$  ev,  $\sigma(n,\gamma)$  deviates considerably from the

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Measurement of the energy ...

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$1/\nu$ -law. This is attributed to a negative  $\text{Cu}^{64}$  level for which  
 $E_0 \sim 0.2$  kev and  $\Gamma_n^0 \sim 5 \cdot 10^{-2}$  ev are obtained. For the  $E_0 \sim 0.58$  kev-level,  
 $\Gamma_\gamma \sim 0.8 \pm 0.1$  ev. There are 10 figures, 2 tables, and 12 references:  
5 Soviet and 7 non-Soviet. The four most recent references to English-  
language publications read as follows: R. M. Brugger et al. Phys. Rev.  
104, 1054, 1957; Hughes D. J., Schwartz R. B. Second Edition B N L-325,  
1958; Hughes D. J., Zimmerman R. L., Chrien R. E. Phys. Rev., Lett. 1,  
461, 1958; Porter, Thomas. Phys. Rev., 104, 483, 1956.

ASSOCIATION: Fizicheskii institut im. P. N. Lebedeva AN SSSR (Physics  
Institute imeni P. N. Lebedev AS USSR)

Card 4/4

38150

S/058/62/000/004/031/160

A058/A101

26.2241

AUTHORS: Kazarnovskiy, M. V., Shapiro, F. L.

TITLE: The theory of thermal neutron diffusion taking velocity distribution into account

PERIODICAL: Referativnyy zhurnal, Fizika, no. 4, 1962, 60, abstract 4B453  
(V sb. "Neytron. fizika". Moscow, Gosatomizdat, 1961, 169 - 178)

TEXT: There was worked out a general approach to the construction of a theory of diffusion with many velocity groups of neutrons. The authors used Laguerre polynomial expansion of neutron density into a series, the  $i$ -th term of the series being considered as the  $i$ -th neutron group. The method is appropriate for cases when the energy of the neutrons emitted by sources is close to thermal, or the energy spectrum of the neutrons of the source is not very essential (e.g., cases of diffusion of neutrons far from the source in stationary problems, or at long times from the moment of pulse in the case of pulse sources). The authors examine the application of two- and three-group approximations of the resultant system of equations. It is shown that taking into account the velocity distri-

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The theory of thermal...

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bution of neutrons in a diffusion approximation leads to the following effects:  
1) a dependence of mean neutron velocity on the size of the system and on other diffusion conditions, and 2) minor corrections in slowing-down times and relaxation lengths of neutron density. Some applications of the obtained results are considered: a pulse source in a limited medium, a stationary source in an infinite medium with a heavy, gaseous moderator. In addition to multivelocity corrections, it is necessary to take into account nondiffusion corrections.

B. Kochurov

[Abstracter's note: Complete translation]

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33006

S/641/61/000/000/033/033  
B102/B138

26.2245

AUTHORS: Kashukeyev, N. T., Popov, Yu.P., Shapiro, F. L.

TITLE: Measurement of energy dependence of  $\text{Cl}(n, \gamma)$  reaction cross sections

SOURCE: Krupchitskiy, P. A., ed. Neytronnaya fizika; sbornik statey. Moscow, 1961, 354-369

TEXT: The energy dependence of radiative neutron capture cross sections was measured in the 10ev-20kev range and studied with a spectrometer based on neutron deceleration in lead. For this purpose fast-neutron pulses (625 cps, 0.5-1  $\mu$ sec pulse duration) were generated in the center of a lead cube. The energy was determined from the slowing-down time  $t$  (in  $\mu$ sec)

according to  $E = [183/(t+0.3)]^2$  kev. The root-mean-square energy spread was  $\sim 15\%$  at  $E \geq 1$  kev and  $35\%$  at  $E = 10$  kev. The specimen and scintillation gamma detector were placed in a channel in the cube, and the neutron capture gamma ray intensity  $J_\gamma(t)$  was measured in dependence on  $t$ .

At the same point the neutron density was also measured with a  $\text{Li}^6\text{F}$  proportional counter.  $\sigma_\gamma(E)$  was determined from the relation

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Measurement of energy dependence...

at  $E_0 = 4.3 \pm 0.5$  kev, at 8.8 kev no peak was observed. The resonance integral in the  $0.49-2 \cdot 10^4$  ev range was found to be  $13.9 \pm 0.7$  barns. For  $E > 2 \cdot 10^4$  ev,  $R_\gamma \sim 0.03$  b. The main contribution to  $R_\gamma$  is due to the negative Cl level, the resonances at 405 ev and 4.3 kev contribute  $0.29 \pm 0.02$  and  $(2.2 \pm 0.7) \cdot 10^{-2}$  b. The contributions of the other spectral ranges were as follows:  $0.49 < E < 250$  ev:  $R_\gamma = 13.5$  b;  $250 < E < 2$  kev:  $R_\gamma = 0.34$  b  $\pm 10$  %;  $E > 2$  kev:  $R_\gamma = 6 \cdot 10^{-2}$  b  $\pm 50$  %. The negative level was found to be at  $E_0 = -210 \pm 10$  ev. Its parameters were:  $\xi = 5/8$ ,  $\Gamma_n^0 = 1.38 \pm 0.02$  ev,  $\Gamma_\gamma = 0.50 \pm 0.01$  ev,  $\sigma_p = 1.2 \pm 0.2$  b,  $R = (1.0 \pm 0.5) \cdot 10^{-13}$  cm,  $\sigma_\gamma = 33.0$  b (calculated for 0.025 ev energy).  
The parameters calculated for the Cl<sup>35</sup> resonance levels at 405 ev and 4.3 kev are given in Tables 2 and 3. The authors thank I. M. Frank for interest, Yu. A. Berezina, A. A. Bergman, A. I. Isakov, I. V. Shtranikh and A. M. Klabukov for assistance. There are 6 figures, 3 tables, and

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26.2200

22873  
S/083/61/010/005/001/015  
B102/3214

AUTHORS: Blokhin, G. Ye., Blokhintsev, D. I., Blyumkina, Yu. A.,  
Bondarenko, I. I., Deryagin, B. N., Zaymovskiy, A. S.,  
Zinov'yev, V. P., Kazachkovskiy, O. D., Kim Khen Bon,  
Krasnoyarov, M. V., Leypunskiy, A. I., Malykh, V. A.,  
Nazarov, P. M., Nikolayev, S. K., Stavisekiy, V. Ya.,  
Ukrainitsev, F. I., Frank, I. M., Shapiro, F. L.,  
Yazvitskiy, Yu. S.

TITLE: A pulsed fast reactor

PERIODICAL: Atomnaya energiya, v. 10, no. 5, 1961, 437-446

TEXT: The present paper gives a description of the pulsed fast reactor of the Ob'yedinenyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) which became critical in June, 1960. This reactor, called M6P (IBR) reactor, serves as pulsed fast neutron source (mean power  $\approx 1$  kw) for physical investigations, particularly for time-of-flight experiments. Its most distinguishing feature is the very small contribution ( $\sim 10^{-4}$ ) of the delayed neutrons in its normal operation; it is about

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A pulsed fast reactor

one hundredth of that of the usual steady uranium reactor. The pulses appear because whenever the reactor becomes supercritical a burst of prompt neutrons results. The half width of these pulses is 36  $\mu$ sec. The frequency with which the pulses are repeated can be varied between 8 and 80 pulses/sec. Fig. 2 shows the construction of this reactor. The periodic change in the reactivity is brought about by the displacement of the two  $U^{235}$  blocks placed in two disks that can be rotated. The main block is pressed in the form of a disk, 1100 mm in diameter, and can be rotated with a peripheral velocity of 276 m/sec (at 6000 rpm) during which it passes through the core center. The reactivity change obtainable from the motion of the main block is 7.4 %, that obtainable from the motion of the auxiliary block is 0.4 %. The stationary part of the core consists of plutonium lumps in steel jackets. The reactor is started by a rough regulator, in this case a movable part of the reflector. It gives a reactivity change at the rate of  $13 \cdot 10^{-5} - 1.3 \cdot 10^{-5} \text{ sec}^{-1}$ . The manually operated rod is also a part of the reflector. Two plutonium rods in electromagnetic suspension serve as scram. They can be separated from the core with an acceleration of 20 g. Their separation causes a reactivity

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A pulsed fast reactor

decrease of 2-1.1 %; the rough regulator allows a reactivity change of 2.4 %, the manual regulator 0.1 %, and the automatic regulator 0.036 %. The reactor possesses also a reactivity booster for the production of one intensive pulse. The control and shield system is an automatically functioning electronic arrangement with BF<sub>3</sub> counters and ionization

chambers. The whole reactor is placed in a room of size 10·10·7 m whose concrete walls allow complete protection from radiation. The most important experimental arrangement consists of a 1000 m long neutron conductor, a metal tube, 400 mm in diameter in the first part and 800 mm in the second part in which a pressure of 0.1 mm Hg is maintained. This conductor connects a chain of so-called "intermediate pavilions" (at distances of 70, 250, 500, 750, and 1000 m from the reactor) in which experiments can be carried out. There is also an additional neutron conductor of 100 m length. The reactor chamber is joined to an experimental chamber in which four neutron beams of up to 800 mm diameter are available. There is such an experimental chamber also above the reactor chamber. Various experiments were carried out with the reactor and they are described in the present paper. These are experiments with stand

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assemblies and slowly moving main block for the determination of the most important parameters of the reactor; experiments with a core assembly (unmoved), experiments with rotating (5000 rpm) main block and a Ra- $\alpha$ -Be source in the core for the investigation of the effect of the multiplication factor, etc. The most important results are represented graphically. For example, Fig. 8 shows the dependence of the half width  $\theta$  of a pulse on the reactivity; the dashed line holds for the quasistationary case, the dot-dash line for the case of  $\theta = K(\tau/\alpha)^{1/3}v^{-2/3}$ , where  $v$  is the velocity of motion of the (rotating) main block; in the quasistationary case  $\theta = 2\sqrt{\epsilon_m/\alpha v^2}$ , where  $\epsilon_m$  is the reactivity at the maximal multiplication factor;  $\epsilon = \epsilon_m - \alpha x^2$ , where  $x$  is the displacement of the main block. The reactor has been actually used for the measurement of the total, scattering, capture, and fission cross sections by the time-of-flight method. Further experiments will be carried out with a view to obtaining increase of power and decrease of the pulse duration. There are 15 figures and 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to the English-language publication reads as follows: J. Orndorf, Nucl. Sci. and Engng, 2, No. 4, 450 (1957).

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AKSENCV, S.I.; ALFIMENKCV, V.F.; LUSHCHIKOV, V.I.; OSTANEVICH, Yu.M.  
SHAPIRO, F.L.; YAN'U-GUAN [Yen Wu-kuang]

Observing the resonance absorption of  $\gamma$ -rays in  $Zn^{67}$ . Zhur. eksp.  
i teor. fiz. 40 no.1:88-90 Ja '61. (MIRA 14:6)

1. Fizicheskiy institut imeni P.N. Lebedeva AN SSSR i Ob'yedinenny  
institut yadernykh issledovaniy.  
(Gamma rays) (Zinc--Isotopes)

BERGKAN, A.A.; SHAPIRO, F.L.

Deviations from the  $1/v$  law of the cross sections of slow  
neutron reactions on light nuclei. Zhur. eksp. i teor.  
fiz. 40 no.5:1270-1281 My '61. (MIRA 14:7)

1. Fizicheskiy institut imeni P.N. Lebedeva AN SSSR.  
(Nuclear reactions) (Neutrons—Capture)

POPOV, Yu.P.; SHAPIRO, F.L.

$Cl^{35}(n, p)$  reaction and the neutron resonance parameters of chlorine. Zhur. eksp. i teor. fiz. 40 no.6:1610-1614 Je '61.  
(MIRA 14:8)

1. Fizicheskiy institut im. P.N. Lebedeva AN SSSR.  
(Nuclear magnetic resonance and relaxation)  
(Chlorine--Isotopes)  
(Neutrons--Capture)  
(Nuclear reactions)

LM32

S/120/62/000/005/003/036  
EO32/E314

AUTHORS: Kozinets, O.I., Shapiro, F.L. and Shtranikh, I.V.

TITLE: A linear ion-buncher

PERIODICAL: Pribery i tekhnika eksperimenta, no. 5, 1962,  
25 - 28

TEXT: This paper describes an ion-buncher in which a mono-energetic ion beam is converted into bunches of monoenergetic ions. The principle of the device is illustrated in Fig. 2. Suppose that ions of velocity  $V_0$  enter the buncher at  $x = 0$ . In order to bunch the ions between  $t = 0$  and  $t = t_H$ , the velocity of each ion must be increased by  $V = V_\Phi - V_0$  at the appropriate time  $t$  and the corresponding coordinate  $x = V_\Phi (t - t_H)$ , where  $t_H$  is the instant at which the ion collection begins. This means that the electric field should travel along the axis of the buncher with the velocity  $V_\Phi$ . The voltage front  $U(x)$  is at rest in the coordinate system moving with the velocity  $V_\Phi$  and if the height of this front  $eU$

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E032/E314

A linear ion-buncher is equal to  $1/2 \text{ mV}^2$ , or somewhat less, then in this system of coordinates the ions are slowed down to zero or some small finite velocity, i.e. they are bunched on the crest of the voltage wave. The bunching coefficient is given by

$$v'/v = \sqrt{1 - eU_{\text{max}}/E} ; E = \frac{1}{2} \text{ mV}^2 \quad (3)$$

where  $v'$  is the ion-drift velocity on the crest of the voltage wave. If the height of the voltage wave  $eU$  is greater than  $1/2 \text{ mV}^2$ , then the ions are reflected from it, the length of the beam is unaltered but the time spread is reduced by a factor equal to  $[2(v'/v_0) - 1]$ . This type of buncher can be used with the aid of an axial set of apertures in which the axial field  $U$  is of the form

$$\begin{aligned} U &= 0 \text{ for } x_{\text{lab}} > v_{\Phi}(t - t_H), \\ U &= U_{\text{max}}/d [x_{\text{lab}} - v_{\Phi}(t - t_H)] \text{ for } v_{\Phi}(t - t_H) - d \leq x_{\text{lab}} \leq v_{\Phi}(t - t_H), \\ U &= U_{\text{max}} \text{ for } x_{\text{lab}} < v_{\Phi}(t - t_H) - d \end{aligned} \quad (6)$$

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A linear ion-buncher

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EO32/E314

For deuterons of energies between 0.6 and 5 kV, linear bunching ratios of 6-7 can be obtained for  $V_{\phi} = 10^8$  cm/sec, initial length of beam 10 cm, voltage "rise length" of 5 cm and initial energy spread of 50 eV. The corresponding time-bunching ratios are 25 - 9.5. Multiple bunching is also possible, at least, in principle. There are 2 figures and 1 table. .

ASSOCIATION: Fizicheskiy institut AN SSSR  
(Physical Institute of the AS USSR)

SUBMITTED: January 13, 1962

Card 3/4<sup>3</sup>



S/056/62/042/004/011/037  
B163/B102

AUTHORS: Popov, Yu. P., Shapiro, F. L.

TITLE: Energy dependence of the  $(n,\gamma)$ -reaction cross sections of a number of odd-Z nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 4, 1962, 988-1000

TEXT: The radiative neutrons capture cross sections were measured for Br, Rb, Nb, Rh, In, Sb, I, Cs, Ir, and the enriched  $\text{Rb}^{85}$  with primary energies below 50 kev. The cross sections were measured with a neutron spectrometer based on the following principle: In a lead cube moderator neutron flashes of 0.5 to 5  $\mu\text{sec}$  are generated in the reaction  $\text{H}^3(d,n)\text{He}^4$ . The decrease of the mean neutron energy  $\bar{E}$  is given by  $\bar{E} = 183/(t + 0.3)^2$  ( $\bar{E}$  in kev,  $t$  in  $\mu\text{sec}$ ). The  $\gamma$  radiation is recorded by a scintillation or proportional gas discharge counter arranged in a channel of the lead cube, alternately with and without the specimen material around the detector.

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SHAPIRO, F. L.

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/S/056/62/042/004/018/037  
B108/B102

AUTHORS: Alfimenkov, V. P., Ostanevich, Yu. M., Ruskov, T.,  
Strelkov, A. V., Shapiro, F. L., Yen Wu-kuang

TITLE: Energy spectrum of the resonance absorption in zinc oxide  
of 92-kev gamma radiation from Zn<sup>67</sup>

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,  
v. 42, no. 4, 1962, 1029 - 1035

TEXT: The Mössbauer effect in Zn<sup>67</sup> has been studied by the Doppler shift and frequency modulation methods. The energy spectrum of 92-kev gamma rays was recorded at ~4.2°K using a source and a filter (up to 33% Zn<sup>67</sup>), both made of ZnO. The statistical error in the measurements was 2·10<sup>-4</sup>. Resonance absorption, observed at zero energy shift, reached a maximum of 2·10<sup>-3</sup>. The line width was somewhat greater than the natural width. The structure of the resonance-absorption energy spectrum shows quadruple splitting of the

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Energy spectrum of ...

the Zn<sup>67</sup> levels but is difficult to interpret because of the insufficient experimental accuracy. The effective Debye temperature of the ZnO was estimated at about 300°K, which is consistent with published data. There are 6 figures and 10 references: 4 Soviet and 6 non-Soviet. The four most recent English-language references read as follows: R. V. Pound, G. A. Rebka, Phys. Rev. Lett., 1, 274; 397, 1960; R. Craig et al. Phys. Rev. Lett., 4, 561, 1960; S. Ruby, D. Bolef. Phys. Rev. Lett., 5, 5, 1960.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: December 9, 1961

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SHAPIRO, F.L.

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S/056/62/042/004/019/037  
E108/B102

AUTHORS: Alfimenkov, V. P., Ostanevich, Yu. M., Ruskov, T.,  
Strelkov, A. V., Shapiro, F. L., Yen Wu-kuang

TITLE: The Mössbauer effect in  $\text{Sm}_2^{149}\text{O}_3$

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,  
v. 42, no. 4, 1962, 1036 - 1037

TEXT: A 22-kev gamma transition in  $\text{Sm}^{149}$  has been observed by  
B. S. Dzhelepov et al. (B. S. Dzhelepov et al. Nucl. Phys., 30, 110, 1962).  
To verify these authors' suggestion that this transition leads to the  
ground state, the present authors made nuclear resonance absorption, thus  
using an  $\text{Sm}_2\text{O}_3 + \text{Eu}_2^{149}\text{O}_3$  source and a movable  $\text{Sm}_2\text{O}_3$  filter and measuring  
at room temperature by the Doppler shift method. The results were positive.  
The upper limit of the level width was  $6 \cdot 10^{-7}$  ev, level lifetime  $\tau > 10^{-9}$   
sec. K. Ya. Gromov, Zh. T. Zhelev, and V. A. Khalkin are thanked for having  
supplied the source. There are 2 figures and 2 non-Soviet references.

Card 1/2

The Mössbauer effect ...

2  
S/056/62/042/004/019/037  
B108/B102

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute  
of Nuclear Research)

SUBMITTED: December 9, 1961

Card 2/2

L 13849-63 EWT(m)/BDS AFFTC/ASD

ACCESSION NR: AP3003158

S/0056/63/044/006/2185/2187

53  
51

AUTHOR: Taran, Yu. V.; Shapiro, F. L.

TITLE: Some methods for polarization and analysis of polarization of intermediate energy neutrons 19

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 2185-2187

TOPIC TAGS: medium energy neutrons, polarization, analysis of polarization, compound nucleus spin

ABSTRACT: Some possibilities are discussed for the polarization and analysis of polarization of neutrons with resonant energies and higher, based on the spin dependence of the nuclear interactions. It is shown that a promising method is to use polarized He sup 3 as an analyzer of neutron polarization. The possible use of a polarization analyzer to measure the depolarization on resonance scattering of neutrons in an unpolarized target. The energies at which these methods can be used are discussed. The strong dependence of the depolarization of the neutrons on the spin of the compound nucleus makes it also possible to determine this spin with sufficient accuracy by measuring the polarization of the scattered neutrons. "In conclusion, the authors take

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L 13849-63

ACCESSION NR: AP3003158

2

this opportunity to thank V. N. Yefimov for valuable discussions." Orig. art.  
has: 5 formulas and 1 table.

ASSOCIATION: Ob''yedinenny'y institut yaderny'kh issledovaniy (Joint Institute  
of Nuclear Research)

SUBMITTED: 02Apr63

DATE ACQ: 23Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 002

OTHER: 022

Card 2/2

FRAIK, I. M.; BUNIN, B. N.; NIKOLAYEV, S. K.; SHABALIN, Ye. P., SHAPIRO, F. L.

"The experience of the pulsed fast reactor operation and its characteristics at injection of neutrons from a microtron."

report submitted for 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-2 Sep 64.



ACCESSION NR: AP4041822

S/2504/64/024/000/0003/0067

AUTHOR: Shapiro, F. L.

TITLE: Investigations of the physics of slow neutrons

SOURCE: AN SSSR. Fizicheskiy institut. Trudy\*, v. 24, 1964.  
Issledovaniya po neytronnoy fizike (Research in neutron physics),  
3-67

TOPIC TAGS: slow neutron, neutron moderation, neutron diffusion,  
neutron spectrometry

ABSTRACT: Some results of the investigations of neutron moderation,  
neutron diffusion, and neutron spectrometry carried out at the  
Laboratory of the Atomic Nucleus, Physics Institute, Academy of  
Sciences SSSR, during the last eight years are reviewed. To a cer-  
tain extent, these investigations were a continuation of the previous  
study, conducted at the same laboratory, which dealt with the neutron  
multiplication in uranium-graphite systems. Orig. art. has: 27  
figures, 3 tables, and 109 formulas.

Card 1/2

ACCESSION NR: AP4041822

ASSOCIATION: none

SUBMITTED: 00

ATD PRESS: 3064

ENCL: 00

SUB CODE: NP

NO REF SOV: 058

OTHER: 057

Card 2/2

L 11438-65 EMT(m)/EPF(c)/EPF(n)-2/EPR Pr-4/Ps-4/Pu-4

P/0046/64/009/07-/0523/0537

ACCESSION NR: AP4045663

AUTHOR: Buras, B.; Leciejewicz, J. (Letseyevich, Ya.); Sosnowksa, I. <sup>B</sup>  
(Sosnovska, I.); Sosnowski, J. (Sosnovski, Ye.); Nitc, W. (Nitts, V.);  
Shapiro, F.

TITLE: The time-of-flight method for investigations of neutron  
crystal structure and its possibilities in connection with very high  
flux reactors

SOURCE: Nukleonika, v. 9, no. 7-8, 1964, 523-537

TOPIC TAGS: powdered crystal, neutron structure, time of flight  
method, powdered crystal structure, diffraction peak

ABSTRACT: A new method for investigating the neutron structure of  
powdered crystals using the time-of-flight technique is described. A  
pulsed neutron beam is scattered on a powdered crystal, and the in-  
tensity of the scattered neutrons is measured at a fixed angle  $2\theta$  by  
means of neutron counters connected to a multichannel time analyser.  
As a result the dependence of intensity on neutron wave lengths is

Card 1/3

L 11438-65

ACCESSION NR: AP4045663

obtained. The peaks are indexed in the usual manner, while the structure factors are determined using a formula for integrated intensity specially derived for this type of experiment. According to this formula the integrated intensity is proportional to the fourth power of the wavelength, thus distinguishing peaks of longer waves so that peaks corresponding to 4—5 Å are also clearly visible. This is very suitable for studying crystals with large unit cells and for studies requiring a very high resolution. Additional advantages of this method are: no higher-order contaminations and an appreciable shortening of the exposure time as compared with the conventional method. The feasibility of this method was proved experimentally at the EWA reactor in Swierk (Poland) (using a chopper) and at the pulsed reactor IBR in the Joint Institute of Nuclear Research in Dubna, USSR, (with a very high flux in the pulse) using powdered samples of Pb, Al, Si, Zn, ZnO. Orig. art. has: 12 figures, 5 formulas, and 2 tables.

ASSOCIATION: none

Card 2/3

L 14438-65

ACCESSION NR: AP4045663

SUBMITTED: 00

ENCL: 00

SUB CODE: SS, NP

NO REF SOV: 003

OTHER: 005

Card 3/3

ACCESSION NR: AP4012526

S/0056/64/046/001/0080/0088

AUTHORS: Konks, V. A.; Popov, Yu. P.; Shapiro, F. L.

TITLE: Cross sections for radiative capture of neutrons with energies up to 50 keV by La-139, Pr-141, Ta-181, and Au-197

SOURCE: Zhurnal eksper. i teoret. fiz., v. 46, no. 1, 1964, 80--88

TOPIC TAGS: lanthanum 139, praseodymium 141, tantalum 181, gold 197, radiative neutron capture, neutron capture cross section, resonance capture integral, neutron slowing down spectrometry, neutron time of flight spectrometry, force function

ABSTRACT: Cross section curves for radiative capture of neutrons and data on resonance capture integrals, obtained with a neutron slowing down time spectrometer employing lead, are presented. These data are of interest because of the relative scarcity of information on the force functions for p-neutrons, and because of their interest

Card 1/3

ACCESSION NR: AP4012526

to reactor designers and in connection with recent theoretical papers discussing volume and surface absorption in the optical model and the effect of the deformation of nuclei. The values of the force functions for p neutrons ( $S_1$ ), determined from an analysis of the energy dependences of the capture cross sections, are found to be  $(2.0 \pm 0.9) \times 10^{-4}$ ,  $(1.1^{+1.1}_{-0.6}) \times 10^{-4}$ ,  $\sim 0.2 \times 10^{-4}$  and  $\sim 0.3 \times 10^{-4}$  for La, Pr, Ta, and Au, respectively. Values of  $14.0 \pm 0.9$  and  $17.6 \pm 0.8$  barns were obtained for the resonance absorption integrals of La and Pr, respectively. The data for Ta and Au are still inconclusive. The results are compared with those of others. "In conclusion, the authors are grateful to Yu. A. Dmitrenko, S. N. Gubernov, A. M. Kalbukov, and Ye. D. Bulatov for maintaining proper operation of the equipment, and to Yu. I. Fenin for the computer calculations." Orig. art. has: 5 figures, 2 formulas, and 2 tables.

Card 2/3

ACCESSION NR: AP4012526

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva AN SSSR  
(Physics Institute, AN SSSR)

SUBMITTED: 12Jul63

DATE ACQ: 26Feb64

ENCL: 00"

SUB CODE: PH, NS

NO REF SOV: 011

OTHER: 017

Card 3/3



ACCESSION NR: AP4043660

S/0056/64/047/002/0777/0778

AUTHORS: Fenin, Yu. I.; Shapiro, F. L.

TITLE: On the connection between the scattering length and the neutron radiative capture cross section

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 2, 1964, 777-778

TOPIC TAGS: scattering length, radiation width, capture cross section, elastic scattering, scattering amplitude, even even nucleus

ABSTRACT: It is shown that in the case of low-energy neutrons, when the main contribution to the interaction with nuclei comes from the partial wave for zero angular momentum, a simple relation exists between the cross sections for elastic scattering and for radiative capture of neutrons in the region between resonances, in the form

(1)

Card 1/2

ACCESSION NR: AP4043660

Here  $\sigma_{\gamma J}$  -- total cross section for radiative capture of neutrons in the channel with spin  $J$ ;  $g_J$  -- statistical weight for the  $J$  channel;  $\lambda$  -- neutron wavelength;  $\Gamma_{\gamma}$  -- radiation width;  $a_J$  -- scattering amplitude for the  $J$  channel. A proof of the formula is presented and it is concluded that this relation can be used to determine radiation widths and capture cross sections for measurements of the total cross sections of even-even nuclei. In some cases the use of this formula can yield valuable information for odd nuclei also. In particular, it is reported that it has been applied to obtain the radiation widths of  $Cl^{35}$  and  $Sc^{45}$ . Orig. art. has: 5 formulas.

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: 15May64

ENCL: 00

SUB CODE: NP

NR REF SOV: 000

OTHER: 002

Card 2/2

L 24444-65 EWT(m) DIAAP

ACCESSION NR: AP4046388

S/0056/64/047/003/0795/0800

AUTHORS: Konks, V. A.; Shapiro, F. L.

TITLE: Cross section for the radiative capture of neutrons with energy up to 50 keV by thallium isotopes <sup>B</sup> /9

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 3, 1964, 795-800

TOPIC TAGS: neutron capture, capture cross section, thallium, isotope, slow neutron, radiative capture, prompt gamma, resonance absorption

ABSTRACT: To obtain more information on the interaction between slow neutrons and thallium nuclei, the authors measured the dependence of the radiative capture cross section on the neutron energy by the slowing-down-time technique. The measurements were made in a spectrometer using the time of slowing down of neutrons in lead

Card 1/3

L 24444-65

ACCESSION NR: AP4046388

(A. A. Bergman et al., Tr. Zhenevskoy konferentsii po mirnomu is-pol'zovaniyu atomnoy energii [Proceedings, Geneva Conference on Peaceful Uses of Atomic Energy], 1955, AN SSSR, v. 4, 166, 1956). The neutron energy ranged up to 50 keV, and the prompt  $\gamma$  rays from the neutron capture were counted. The measurements were made with natural and enriched thallium samples. Plots of the cross sections in the resonance absorption integrals are presented. The radiation width of the 238-eV level in  $Tl^{203}$  is found to be  $0.64 \pm 0.07$  eV. The mean distances between the resonances in  $Tl^{203}$  and  $Tl^{205}$  are determined on the basis of the value of the capture cross section. The results are compared with those obtained by others. "The authors thank Yu. P. Popov for a discussion of the work, and Yu. A. Dmitrenko, S. N. Gubernov, A. M. Klabukov, and A. Ye. Samsonov for operating the neutron spectrometer, S. P. Kapchigashev and S. A. Romanov for assistance in the measurements, and V. S. Zolotarev and his co-workers for supplying the separated thallium isotopes."

Orig. art. has: 2 figures and 3 tables.

Card 2/3

L 24444-65

ACCESSION NR: AP4046388

2

ASSOCIATION: Fizicheskiy institut im. P. N. Lebedeva Akademii nauk SSSR (Physics Institute, Academy of Sciences SSSR); Institut yadernoy fiziki Akademii nauk Kazakhskoy SSR (Institute of Nuclear Physics, Academy of Sciences, Kazakh SSR)

SUBMITTED: 19Mar64

ENCL: 00

SUB CODE: NP

NR REF SOV: 009

OTHER: 012

Card 3/3

SHAPIRO, F. M.

Jan/<sup>F</sup>eb 49

USSR/Medicine - Anatamay  
Medicine - Blood Transfusion, Complications

"Pathoanatomic Analysis of Post-Transfusion Complications," N. M. Nemenova, F. M. Shapiro, Pathoanat Lab, Cen Ord of Lenin Inst of Hematol and Blood Transfusion, Acad Med Sci USSR, 8  $\frac{1}{2}$  pp

"Arkhir Patologii" Vol XI, No 1

Describes nine cases in which death followed blood transfusion. Diagnosis while patients were alive was post-transfusion shock. This was confirmed in seven cases by pathoanatomical examination. Causes of post-transfusion shock were: blood group incompatibility in one case, transfusion of infected blood in three cases, and increased sensitivity of recipients due to severe septic illness in two cases. Blood transfusion was contraindicated in one case. Greatest number of complications were in A(II) blood group. Submitted 16 Aug 47.

PA 42/49T56

SHAPIRO, F.M., kandidat meditsinskikh nauk

Elena Iakovlevna Gertsenberg. Arkh.pat. 18 no.6:138-139 '56.  
(MLRA 9:12)

(GERTSENBERG, ELENA IAKOVLEVNA, 1886- )

SHAPIRO, F.M.; SOLOVEY, M.G. (Moskva)

Gastric changes in various types of hypertensive disease. Arkh.pat.  
21 no.3:28-34 '59. (MIRA 12:12)

1. Iz patologoanatomicheskogo otdeleniya (zav. - prof. Ye.Ya. Gertsenberg) 6-y Moskovskoy gorodskoy klinicheskoy bol'nitsy (glavnyy vrach N.S. Shevyakov) i terapevticheskogo otdeleniya (zav. - prof. B.Ye. Votchal) klinicheskoy ordena Lenina bol'nitsy imeni S.P. Botkina (glavnyy vrach - prof. A.N. Shabanov).

(HYPERTENSION, pathol.  
stomach changes (Rus))  
(STOMACH, pathol.  
in hypertension (Rus))



PORUDOMINSKIY, I. M.; NYUNIKOVA, O. I.; SHAPIRO, F. M.

Histological testicular changes in sterile patients. Urologiia  
no.2:51-56 '62. (MIRA 15:4)

1. Iz otdela urologii (zav. - prof. I. M. Porudominskiy) Tsentral'-  
nogo kozhno-venerologicheskogo instituta i patologoanatomicheskogo  
otdeleniya (zav. - prof. Ye. Ya. Gertsenberg[deceased]) Moskovskoy  
klinicheskoy bol'nitsy No. 6.

(TESTICLE--DISEASES) (STERILITY)

VOROB'Y, A.K.; LYUR'YE, G.S.; SHAPIRO, G., red.; GAL'BURT, A.,  
spets. red.

[Mechanization and advanced methods for the maintenance and repair of motor vehicles; practice of the automotive transportation units of the White-Russian S.S.R.] Mekhanizatsiia i peredovye metody tekhnicheskogo obsluzhivaniia i remonta avtomobilei; iz opyta raboty avtokhoziaistv Belorusskoi SSR Minsk, In-t nauchno-tekhn. informatsii i propagandy Gos.komiteta Soveta Ministrov BSSR po koordinatsii nauchno-issl. rabot, 1963. 74 p. (MIRA 18:2)

USSR/Human and Animal Morphology (Normal and  
Pathological). Nervous System. Periph-  
eral Nervous System.

S-2

Abs Jour: Ref Zhur-Biol., No 16, 1953, 74310

Author : Braude, L. I., Shapiro, G. A.

Inst : -

Title : On Participation of Solar Plexus Cells in  
the Innervation of the Uterus.

Orig Pub: V sb.: Zdravookhr. Sov. Latvii, 11. Riga,  
1954, 94-100

Abstract: In cats, the uterus was removed in aseptic  
conditions and, after 2-11 days following  
surgery, the state of the neurons of the  
solar plexus and of the lower mesenteric  
ganglia was studied in a section series.

Card : 1/2

SHAPIRO, G.A., podpolkovnik meditsinskoy sluzhby, kandidat meditsinskikh nauk; KORZH, A.V., mayor meditsinskoy sluzhby.

Treating logoneuroses. Voen.-med. zhur. no.9:52-54 S '55.  
(STAMMERING) (MLRA 9:9)

24(7),24(3)

AUTHORS:

Vaynshteyn, E. Ye., Kotlyar, B. I.,  
Shapiro, G. A.

SOV/20-125-1-13/67

TITLE:

Investigation of the Fine Structure of X-ray Absorption Spectra  
of Iron in Some Antiferromagnetics and Ferrites (Issledovaniye  
tonkoy struktury rentgenovskikh spektrov pogloshcheniya  
zheleza v nekotorykh antiferromagnetikakh i ferritakh)

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 1, pp 55-58  
(USSR)

ABSTRACT:

In the authors' opinion this is the first experimental  
investigation into the subject given in the title. The purpose  
is to clarify the direction and the magnitude of the varia-  
tions in the fine structure of X-ray-K-absorption spectra of  
iron in antiferromagnetics and ferrites. These variations  
are related to those occurring in the magnetic state of the  
said substances. A further aim is that of finding ways for  
the most suitable development of these investigations. The  
antiferromagnetic modification of iron oxide ( $\alpha\text{-Fe}_2\text{O}_3$ ) and the  
group of ferrites Ni,Co,Mn,Sr and Zn were selected for the  
experiment. The authors used a focusing X-ray spectrograph

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Investigation of the Fine Structure of X-ray  
Absorption Spectra of Iron in Some Antiferro-  
magnetics and Ferrites

SOV/20-125-1-13/67

of the Iogann type. Some of the spectra of  $\alpha\text{-Fe}_2\text{O}_3$  and  $\text{MnO.Fe}_2\text{O}_3$  recorded in this way are illustrated in 2 diagrams.

A remarkable (almost treble for iron oxide and double for  $\text{MnO.Fe}_2\text{O}_3$ ) change of absorber thickness influences but very little the relative intensity of the longwave range in the absorption spectrum of iron in these compounds, leads, however, to an impoverishment in the fluctuations and to a distortion of the true ratio of their intensities at the shortwave side of the absorption limit. It was found by a similar series of experiments that the optimum density of the absorber corresponds to the density  $5 \text{ mg/cm}^2$ . Two further diagrams show the group of the absorption edges of iron in various compounds and the absorption edge of iron in iron ferrite and iron oxide. The following provisional conclusions were drawn from the experimental data: 1) the wavelength of the first absorption maximum and the position of the center of the absorption edge of iron in  $\alpha\text{-Fe}_2\text{O}_3$  in the ferrites investigated practically do not depend on the magnetic state of the substance. In the

Card 2/4

Investigation of the Fine Structure of X-ray  
Absorption Spectra of Iron in Some Antiferro-  
magnetics and Ferrites

SOV/20-125-1-13/67

group of the ferrites investigated the said wavelength also does not depend on the nature of the bivalent metal. 2) The ordered distribution of the electron spins in the antiferromagnetic lowers the relative intensity of the longwave range in the absorption spectrum of the transition metal, as compared to the paramagnetic or ferromagnetic state of the substance. 3) At the shortwave side of the X-ray absorption spectra of all ferrites investigated here a more or less clearly marked fine structure was observed. 4) These conclusions are merely of a provisional nature and must therefore be substantiated by further purposive and systematic experiments. Some of these are being carried out at present in the authors' laboratory. There are 4 figures and 12 references, 5 of which are Soviet.

ASSOCIATION:

Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo Akademii nauk SSSR (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences, USSR) Odesskiy pedagogicheskiy Institut im.

Card 3/4

Investigation of the Fine Structure of X-ray  
Absorption Spectra of Iron in Some Antiferro-  
magnetics and Ferrites

SOV/20-125-1-13/67

K. D. Ushinskogo (Odessa Pedagogical Institute imeni K. D.  
Ushinskiy)

PRESENTED: November 19, 1958, by A. P. Vinogradov, Academician

SUBMITTED: November 17, 1958

Card 4/4



S/058/61/000/003/002/027  
A001/A001

Translation from: Referativnyi zhurnal, Fizika, 1961, No. 3, p. 171, # 3V87

AUTHORS: Kotlyar, B. I., Shapiro, G. A.

TITLE: Investigation of the  $K\beta$ -Group of Mn and Cu X-Ray Emission Spectra in Some Alloys of the Cu-Mn and Cu-Mn-Al Systems

PERIODICAL: "Nauchn. zap. Fiz.-matem. fak. Odessk. gos. ped. in-t", 1958, Vol. 22, No. 1, pp. 71-76

TEXT: The authors investigated wavelengths of the lines  $Mn-K\beta$ ,  $Mn-K\beta_5$ ,  $Mn-K\beta_1$ ,  $Cu-K\beta_1$  and  $Cu-K\beta_5$ , as well as asymmetry indices of the lines  $Mn-K\beta_1$  and  $Cu-K\beta_1$  and width of the line  $Mn-K_1$  in metal Mn and Cu, alloys of the Cu-Mn system with anomalous high paramagnetic susceptibility, and in ferromagnetic Geissler alloys of the Cu-Mn-Al system. The spectra were obtained on a spectrograph with the photographic recording in the first order of reflection from planes (1340) of quartz crystal with focusing by the Iohann method. Dispersion in the region of the  $K\beta$ -groups of Mn and Cu amounted respectively to 2.7 and 3.8 X/mm. The most significant changes, as compared with pure metals, were discovered in

Card 1/2

S/058/61/000/003/002/027  
A001/A001

Investigation of the K -group of Mn and Cu X-Ray Emission Spectra in Some Alloys  
of the Cu-Mn and Cu-Mn-Al Systems

the following spectral positions of the lines: for Mn-K $\beta_1$  up to -0.61 ev; Cu-K $\beta_1$  up to -1.22 ev; Mn-K $\beta_5$  up to + 1.27 ev. The shift of line CuK $\beta$  varies from 0.94 to +2.61 ev. In passing through the Curie point of Cu<sub>2</sub>MnAl alloy, line K $\beta'$  shifts by -1.89 ev.

M. Blokhin

Translator's note: This is the full translation of the original Russian abstract.

Card 2/2

23301

S/058/61/000/006/016/063  
A001/A101

9,4300 (1147,1155,1151)

AUTHORS Vaynshteyn, E.Ye., Kotlyar, B.I., Shapiro, G.A.

TITLE The fine structure of iron X-ray absorption spectra in some ferrites

PERIODICAL Referativnyy zhurnal, Fizika, no. 6, 1961, 150, abstract 6V111  
("Nauchn. zap. kafedr matem. fiz. i yestestvozn. Gilesek. gos. ped.  
in -", 1959, v. 24, no. 1, 34 - 39)

TEXT The K-spectra of Fe absorption in antiferromagnetic oxide  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> and ferrites of Ni, Co, Mn, Cr and Zn were investigated on a X-ray focusing (according to Johann) spectrophotograph with a quartz crystal (1340). It was found out that the position of the first absorption maximum in all substances investigated did not practically depend on the magnetic state of the substance and was not sensitive to replacement of one bivalent metal by the other. In the antiferromagnetic  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> occurs decrease of absorption in the initial region of the K-edge (in comparison with para- and ferromagnetic modification), which is due to ordering of electron spins and overlapping of the vacant part of 3d-shell with 4s and 4p-states. The shortwave fine structure of absorption K-edges in ferrites can be

Card 1/2

23337

S/058/61/000/006/016/063  
A001/A101

The fine structure

interpreted as a result of cross transitions of 1s-electrons of the absorbing atoms to the vacant places in p-shells of  $O^{2-}$  ions; the excited state of the latter is caused by the existence of an indirect bond between magneto-active atoms according to Kramers' hypothesis.

I. Nikiforov

[Astrakhan's note. Complete translation]

Card 2/2

45259  
S/226/62/000/006/011/016  
E039/E535

18.8100

AUTHORS: Vaynshteyn, E.Ye., Gunchenko, A.I., Kotlyar, B.I.,  
Ovrutskaya, R.M. and Shapiro, G.A.

TITLE: The effect of small additions of oxides of yttrium,  
lanthanum and cerium on certain magnetic character-  
istics of magnesium-manganese ferrites and their X-ray  
spectra

PERIODICAL: Poroshkovaya metallurgiya, no.6 , 1962, 72-80

TEXT: The properties of Mn and Mg-Mn ferrites containing  
43 to 50%  $\text{Fe}_2\text{O}_3$ , from 19 to 50% MnO, from 15 to 28% MgO and for  
some ferrites with additions of up to 5% oxides of calcium and  
zinc are investigated. The addition of up to 2%  $\text{La}_2\text{O}_3$  had very  
little effect on the induction of the ferrites while the addition  
of  $\text{CeO}_2$  and  $\text{Y}_2\text{O}_3$  caused a marked decrease in the induction. The  
effect of these additions on the X-ray K spectra of Fe and Mn in  
these ferrites is also examined. The changes in the K spectra are  
well correlated with the changes in magnetic induction of the  
corresponding ferrites. The absorption spectra are most sensitive  
to the addition of  $\text{Y}_2\text{O}_3$  and less so to  $\text{CeO}_2$ . In ferrites containing  
Card 1/2

The effect of small additions of ... S/226/62/000/006/011/016  
EO39/E535

a sufficiently large admixture of rare earth elements (more for Ce and significantly less for Y) the effect on the absorption spectrum for iron is to produce an increase in width of the final photoelectric transition level and the appearance of a supplementary absorption band on the short wavelength side of the edge. From the analysis of the experimental data inferences are drawn on the possible mechanism of the effect of admixtures on the energy state of the atoms of the basic components of the ferrites. There are 10 figures. f

ASSOCIATIONS: Institut neorganicheskoy khimii SO AN SSSR  
(Institute of Inorganic Chemistry SO AS USSR),  
Institut metallokeramiki i spetsialnykh splavov  
AN USSR (Institute of Metalceramics and Special  
Alloys AS UkrSSR),  
Odesskiy pedagogicheskiy institut im.K.D.Ushinskogo  
(Odessa Pedagogic Institute imeni K.D.Ushinskiy)

SUBMITTED: April 14, 1962

Card 2/2

CHAFIRO, G. A.

Practical work in steel construction in industrial plants Moskva, Gos. izd-vo lit-ry  
pos stroitel'stva i arkhitektury, 1925. 265 p. (53-15592)

16004.547

SPANIN, G. A.

Doc Tech Sci

Dissertation: "Work of the Rivet Joints of Steel Structures."

25/4/50

Central Sci Res Inst of Industrial Structures - TSNIPS.

SO Vecheryaya Moskva  
Sum 71



SHAPIRO, G. A.

Technology

The actual work of steel structures of industrial mills, Moskva, 1952.

Monthly List of Russian Accessions, Library of Congress, December 1952, UNCLASSIFIED

SHAPIRO, G.

DOSIK, P., inzhener; SHAPIRO, G., inzhener.

Assembly and welding of welded metal spans. Avt.transp. 32 no.3:  
19-22 Mr '54. (MLRA 7:8)

(Bridges--Construction)

SHAPIRO, G.A., doktor tekhnicheskikh nauk.

Preventing breakdowns of steel frames in roofs of industrial buildings.  
Stroi. prom. 35 no.5:22-27 Mv '57. (MLRA 10:6)

(Roofing, Iron and steel)

SHAPIRO, G.A., inzh.

Rapid cooling of VR-25-2 turbines. *Energetik* 6 no. 1:12-13 Ja '58.  
(MIRA 11:8)

(Steam turbines--Cooling)

SHAPIRO, G.A. (Moskva)

Local stresses in crane-beam webs subjected to eccentric loads.  
Stroi.mekh.i rasch.soor. 1 no.5:29-35 '59. (MIRA 13:1)  
(Cranes, derricks, etc.) (Strains and stresses)

10 7400  
24 4200

25236

S/122/60/000/002/003/018  
A161/A130

AUTHORS: Bat', A. A., Engineer; Shapiro, G. A., Doctor of Technical Sciences

TITLE: Steel structures endurance calculation

PERIODICAL: Vestnik mashinostroyeniya, no. 2, 1960, 13 - 17

TEXT: Fatigue cracks have been revealed in the course of several years in some elements of steel structures, particularly in welded crane way beams. The authors criticize the standard Soviet calculation method "NiTU 121-55" which does not consider varying service conditions of structures, stress the difference between the service of machine parts and structural elements, the detrimental effect of arc welding and riveting used for structures, etc. In their opinion the fundamental calculation rule must be to let the maximum stresses in the calculated element not exceed the rated fatigue resistance  $R_{\gamma CT}$  ( $R_{fat}$ ) being equal (with a strength reserve) to the endurance limit calculated for the load cycles number  $N$  for the whole life time of the structure. It is recommended to determine the analytical dependence of  $R_{fat}$  on the fundamental parameters affecting the endurance limit (mainly in tension) by two combined equations:

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Steel structures endurance calculation

$$\sigma_{[N \neq 2 \cdot 10^6]}^m = \sigma_{[N=2 \cdot 10^6]}^m \cdot 2 \cdot 10^6; \quad (1)$$

$$\sigma_{[N=2 \cdot 10^6]} = \frac{1}{\left(\frac{\beta}{2\sigma_{-1}} + \frac{1}{2\sigma_b}\right) - \left(\frac{\beta}{2\sigma_{-1}} + \frac{1}{2\sigma_b}\right)\rho}; \quad (2)$$

the first of which expresses the Veler curve, and the second the basic straight branch of the Smith diagram. This second equation has been derived assuming that the straight Smith diagram branch passes points with stress values equal to the endurance limit  $\sigma_{-1}$  ( $\rho = -1$  and  $N = 2$  million) and the ultimate tensile stress limit  $\sigma_b$ . This condition is right for construction steel with a rolled surface, and the second equation takes into account the effect of the effective stress concentration factor ( $\rho$ ). As stated in Ref. 3 [Gokhberg, M. M., Metallicheskiye konstruksii kranov (Metal structures of cranes), Mashgiz, 1959]  $\sigma_{-1}$  at  $N = 2$  million equals one third of  $\sigma_b$  in steel with a rolled surface, and equations (1) and (2) give

$$\sigma_{[N \neq 2 \cdot 10^6]} = \frac{2\sigma_b \sqrt{\frac{2 \cdot 10^6}{N}}}{(3\beta+1) - (3\beta-1)\rho} \text{ kg/mm}^2, \quad (3)$$

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Steel structures endurance calculation

or the rated fatigue resistance. The factor  $\sqrt[m]{\frac{2 \cdot 10^6}{N}}$  can be presented in a short numerical table (Table 2) if all structural steel grades are divided into two classes by the fatigue resistance, and the joints into several types with a certain  $\beta$  factor: The fatigue resistance can then be determined simply and quickly. The stresses from work loads must also be calculated, and the real service of the crane way beams in various shops in metallurgical works had been studied (Ref. 2: A. A. Bat', O raschete na vynoslivost', "Stroitel'naya mekhanika i raschet sooruzheniy", no. 5, 1959), and it was stated that the stress varied in a wide range of 19 to 365 thousand times a year, and the stress values from 210 to 810 kg/cm<sup>2</sup>. A draft "Instruction for designing steel structures of industrial buildings and constructions taking fatigue into consideration" had been set up after the observations. The Instruction includes rules that can eliminate the calculation of the endurance limit of crane way beams. The Instruction draft has been developed by two organizations: the "Proyektstal'konstruktsiya" Institute and the Tsentral'nyy nauchno-issledovatel'skiy institut stroitel'nykh konstruktsiy (Central Scientific Research Institute for Structural Parts). The aspects discussed in this article apply in a part for cranes, bridges and RR cars structures. There are 3 tables and 5 Soviet-bloc references.

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Steel structures endurance calculation

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Table 2.

p	Значения $\sqrt[m]{\frac{2 \cdot 10^6}{N}}$ при $\beta m = 12$						$\sigma_{\text{норм}}^2$ при $N = 10^6$ и более
	при $N = 0,2$ млн.	при $N = 0,6$ млн.	при $N = 1$ млн.	при $N = 2$ млн.	при $N = 3$ млн.	при $N = 5$ млн.	
1,0	1,21	1,11	1,06	1,00	0,97	0,93	0,87
1,1	1,23	1,12	1,06	1,00	0,97	0,92	0,86
1,2	1,26	1,13	1,07	1,00	0,96	0,91	0,85
1,4	1,31	1,15	1,09	1,00	0,95	0,90	0,83
1,5	1,33	1,16	1,09	1,00	0,95	0,89	0,82
1,9	1,44	1,21	1,12	1,00	0,94	0,87	0,77
2,0	1,47	1,22	1,12	1,00	0,94	0,86	0,77
2,5	1,61	1,28	1,15	1,00	0,92	0,83	0,72
2,7	1,68	1,31	1,17	1,00	0,91	0,81	0,70
3,3	1,93	1,39	1,22	1,00	0,89	0,78	0,64
3,5	1,96	1,42	1,23	1,00	0,89	0,77	0,63
4,5	2,38	1,57	1,32	1,00	0,96	0,71	0,55

Card 4/4

SEAFIRO, G.A.; ZOTOV, B.K.

Are horizontal partitions between power cables in cable tunnels  
necessary? From.sadrg. 15 no.4:32 ap '60.  
(MIRA 1):6)

1. Elektromontash -54.  
(Electric lines--Underground)

SHAPIRO, G.A., doktor tekhn.nauk

Methods for increasing the bearing capacity of steel construction  
elements in steel smelting shops. Prom.stroi. 38 no.2:46-49  
'60. (MIRA 13:5)

(Building, Iron and steel)

BAT', A.A., inzh.; SHAPIRO, G.A., doktor tekhn.nauk

Stress analysis of steel construction elements. Vest.mash. 45  
no.2:13-17 F '60. (MIRA 13:5)

(Building, Iron and steel)

SHAPIRO, G.A., doktor tekhn.nauk; ZAKHAROV, V.F., inzh.

Use of rod reinforcement made of 30KhG2S steel. Bet. 1 zhel.-bet.  
8 no.2:59-61 F '62. (MIRA 16:5)  
(Concrete reinforcement---Testing)

SHAPIRO, G.A., doktor tekhn. nauk, red.; BORODINA, I.S., red.  
izd-va; MOCHALINA, Z.S., tekhn. red.

[Work in constructing apartment houses made of large-sized components] Rabota konstruktsii zhilykh zdaniy iz krupno-razmernykh elementov; sbornik statei pod red. G.A.Shapiro. Moskva, Gosstroizdat, 1963. 191 p.  
(MIRA 16:12)

1. Moscow. Tsentral'nyy nauchno-issledovatel'skiy i proyektno-eksperimental'nyy institut industrial'nykh zhilykh i massovykh kul'turno-bytovykh zdaniy.  
(Buildings, Prefabricated)

SHAPIRO, G.A., inzh.; BOKOV, A.S., inzh.

Operating mode of a turbine using a generator in the capacity  
of a synchronous compensator. Elek. sta. 34 no.10:38-41 0 '63.  
(MIRA 16:12)

SHAPIRO, G.A., inzh.; POMIN, Ye.V., inzh.

Start of hot PT-50-130/13 turbines. Elek. sta. 35 no.11:67-68  
N 162. (MIRA 18:1)



SHAPIRO, P. B.

"The Clinical Aspects and Therapy of Diphtheritic Paralysis," No. 2, 1948: Nerve Clinic,  
Gen. Sci. Res. Pediatric Inst., Ministry of Public Health RSFSR, -cl948-.

SHAPIRO, G. B.

"Still's Disease in Children," Pediatrics, No. 4, 1948. Rheumatic Children's Clinic,  
Clinical Children's Hosp. Moscow, -1948-.

FUTER, D.S.; PROKHOROVICH, Ye.V.; SHAPIRO, G.B.; GRABOVA, F.N.

Urgent problems in the treatment of tuberculous meningitis. Vop.  
okh.mat. i det. 4 no.6:3-7 N-D '59. (MIRA 13:4)

1. Iz Gosudarstvennogo pediatricheskogo instituta Ministerstva  
zdravookhraneniya RSFSR i detskoy gorodskoy klinicheskoy bol'nitsy  
No.1 (Moskva).

(MENINGES--TUBERCULOSIS)

BREGADZE, I.L., professor; SHAPIRO, G.D.

Technic of retrograde bougienage in cicatrical strictures of  
the esophagus in children. Vest.khir. no.3:29-31 '62. (MIRA 15:3)

1. Iz gospi'tal'noy khirurgicheskoy kliniki (zav. - prof. I.L.  
Bregadze) Novosibirskogo meditsinskogo instituta na baze oblast-  
noy klinicheskoy bol'nitsy (gl. vrach - zasl. vrach RSFSR  
Z.A. Kireyeva).

(ESOPHAGUS--WOUNDS AND INJURIES) (BOUGIES)

SHAPIRO, G.I., inzhener.

Development of spinning cotton waste. Tekst.prom. 14 no.7:20

Jl '54.

(MIRA 7:8)

(Cotton spinning)

SHAPIRO, G.I.

Cutter holder with duplicating roller. Khim.prom. no.1:47-49  
Ja-F '54. (MLRA 7:4)

1. Karacharovskiy zavod plastmass.  
(Cutting tools) (Plastic materials)

15 HAPIRO, G.I.

5(5): 25(2)

PHASE I BOOK EXHIBITION

SON/2304

Moscow. Dom nauchno-tekhnicheskoy propagandy Iam F.E. Dzerzhinskogo

Plastmassy v mashinostroyenii (Plastics in Machine Building) Moscow, Mashgiz, 1959. 296 p. Erata slip inserted. 8,000 copies printed.

Sponsoring Agency: Obshchestvo po rasprostraneniyu politicheskikh i nauchnykh knazyh KUPRI.

Ed. (Title page): V.K. Zaporozhnyi. Ed. (Inside book): B.M. Rokin, Engineer; Ed. of Publishing House: G.M. Kozlov; Tech. Ed.: A. P. Oyarov; Managing Ed. for Literature on Machine Building and Instrument Making (Mashgiz): M.V. Pokrovskiy, Engineer.

PURPOSE: This collection of articles is intended for engineers and technicians in the machine-building industry.

COVERAGE: This collection reviews the progress made by the Soviet Union in the field of manufacturing new plastic materials and fabricating different plastic material articles for use in the machine-building industry. Physicochemical and dielectric properties of phenolite, decarbonate, fluoroplastics, epoxy resins, polyamides, laminated plastics, and fibreglass plastics are analyzed and their use in machine building described. Characteristics and composition of adhesives and bonding agents are given and the technology of their use is explained. Methods of coating of plastics achieved by vacuum evaporation is reviewed, as well as methods of coating of plastics achieved by vacuum evaporation is reviewed, as well as equipment used for manufacturing and fabricating plastics and articles made of plastics. Mechanisation of certain operations and automatic control of various processes are discussed. No personalities are mentioned. References accompany individual articles.

Plastova, K.B., and M.K. Matfeyevich. Polyamide Resins 19

Gorbunov, V.S. Laminated Plastics With Fiberglass Base and Paper Base Used as Construction Material 29

Prizant, I.K. Phenolite and Decarbonate -- Water and Acid Resistant Plastics for Electrical Insulation

12

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117

128

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187

AVIATION: Library of Congress

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2

S/184/60/000/004/011/021  
A109/A029

AUTHORS: Kagan, D.F., Candidate of Technical Sciences; Shapiro, G.I.; Gus-  
ev, G.G.; - Graduate Engineers

TITLE: On the Use of Lined Pipes

PERIODICAL: Khimicheskoye Mashinostroyeniye, 1960, No. 4, pp. 34 - 36

TEXT: At present steel pipes lined with vinyl plastics are produced by the Pervoural'skiy starotrubnyy zavod (Pervoural'sk Pipe Plant) and the Dnepropetrovskiy truboprokatnyy zavod im. V.I. Lenina (Dnepropetrovsk Pipe Rolling Plant imeni V.I. Lenin). The production method is based on simultaneous thermal processing of metal pipes and of prestressed plastics pipes (Refs. 1 and 4). In some cases the adhesion of the lining was defective near pipe joints and led to longitudinal displacement of the lining. The lining is elastically pressed to the metal pipe which causes a considerable friction. At normal temperatures the stress needed to push the lining out of the pipe is 220 kg. After 5 h at 60°C the lining drops out at a slight pressure. This lack of firm adhesion necessitates a careful choice of pipe joints. Figure 3 shows a pipe root before and after test. Joints excluding a dislocation of lining are shown in Figure 4 and

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A109/A029

On the Use of Lined Pipes

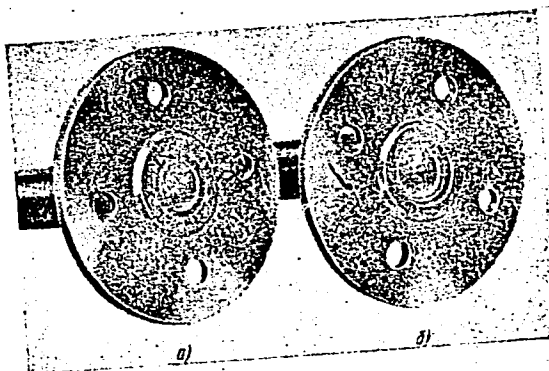
specific construction information is given. Their common feature is the appearance of longitudinal stress in the lining at changing temperatures. Compressive stress is negligible and does not affect the shape of the lining. Tensile stress can be considerable but has no adverse effect as the safety coefficient of the lining is sufficient. At an elasticity modulus of  $E = 40,000 \text{ kg/cm}^2$  and a temperature drop of  $500^\circ\text{C}$  the relative expansion of the lining is  $0.34\%$ . Stresses were determined according to Hooke's law and are equal to  $135 \text{ kg/cm}^2$  which does not exceed the tensile strength of vinyl plastics. There are 5 figures, 1 table and 7 references: 1 English and 6 Soviet. ✓

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On the Use of Lined Pipes

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Figure 3. Root of a Lined Pipe:  
a - before testing; b - after  
testing with water at 70°C in the  
course of 5 h.



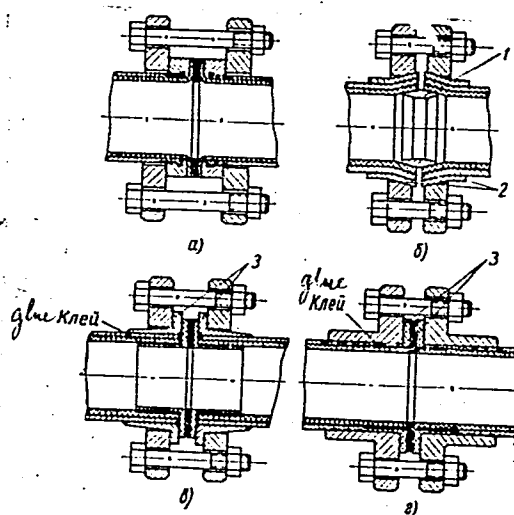
Фиг. 3. Торцы футерованной трубы:  
а — до испытания; б — после испытания водой при 70° в течение  
5 час.

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On the Use of Lined Pipes

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Figure 4. Types of Joints of Lined Pipes Guaranteeing Operation Reliability: 1 - lens; 2 - detachable rings; 3 - bushes made of vinyl plastics.



Фиг. 4. Типы соединений футерованных труб, обеспечивающие надежность в работе:  
1 — линза; 2 — разборные кольца; 3 — бусы из винилпласта.

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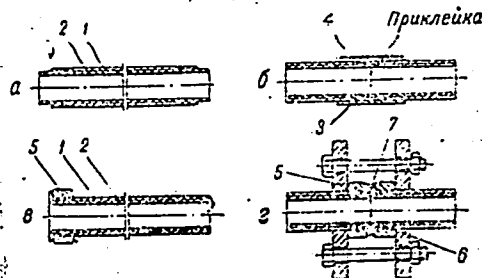
S/193/60/000/012/013/018  
A004/A001

AUTHORS: Kagan, D. F., Shapiro, G. I.

TITLE: Lined Pipes and Their Application in the National Economy

PERIODICAL: Byulleten' tekhniko-ekonomicheskoy informatsii, 1960, No.12, pp.56-57

TEXT: The Nauchno-issledovatel'skiy institut sanitarnoy tekhniki Akademii stroitel'stva i arkhitektury SSSR (Scientific Research Institute of Sanitary Engineering of the Academy of Civil Engineering and Architecture of the USSR) has developed a new method and technology of producing pipes lined with vinyl-plastics. The lined pipe, shown in the illustration is composed of a sheathing pipe of grade 10 or 20 carbon steel and an inner plastic pipe pressed against the outer steel pipe. There are no additional bonds between the plastic layer and sheathing which facilitates the production. The illustration shows how detachable and non-detachable pipe joints are produced.



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Lined Pipes and Their Application in the National Economy A004/A001

Figure:

a - pipe with protruding ends of the lining layer;  $\delta$  (b) - non-detachable glued pipe joint;  $\epsilon$  (v) - pipe with flanged ends of the lining layer;  $\zeta$  (g) - detachable pipe joint; 1 - metallic sheathing; 2 - lining layer; 3 - vinylplastic sleeve; 4 - metallic coupling; 5 - end bushing; 6 - free flange; 7 - washer. The plastic lining makes the metal pipe corrosion-resistant, while the metallic pipe relieves the plastic one from internal pressure by taking up the whole load. Tests carried out in various fields of industry showed that this kind of pipe operates satisfactorily at temperatures in the range of 70 - 90°C and at high pressures, while ordinary low-pressure vinylplastic pipes would not stand more than 50-55°C. The Dnepropetrovskiy truboprolatnyy zavod im. Lenina (Dnepropetrovsk Pipe Rolling Plant im. Lenin) and the Pervoural'skiy starotrubnyy zavod (First Ural Old Pipe Plant) manufactured vinylplastic-lined pipes from 10 to 100 mm in diameter. It is pointed out that carbon-steel pipes lined with vinylplastics are considerably cheaper than stainless steel pipes and, by their longer life, cut down service costs considerably. The authors mention a number of foreign firms producing lined pipes, e. g. Johns and Lowling (USA), Tube de la Meuse (Belgium), Huels and Dynamit A.G., (West Germany), and point out that various compounds on polyvinylchloride basis and copolymers of vinyl chloride are used as

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S/193/60/000/012/013/018

Lined Pipes and Their Application in the National Economy ACO4/A001

lining. The cost price of the lined pipes manufactured in USA is lower than those made by the First Ural Old Pipe Plant, but, according to the authors, the latter will produce pipes in the next future at prices lower than the foreign ones. The authors stress the point that successful service is only warranted if the pipe joints with their profile parts and armature are made according to the technical requirements under due consideration of the specific characteristics of lined pipes, viz. the presence of two layers, considerable difference in the coefficient of linear expansion of the two materials, dependence of the physical-mechanical properties of plastics on the temperature, etc. There is 1 figure.

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S/867/62/000/012/001/001  
A006/A101

AUTHORS: Danilenko, L. F., Shatskova, V. A., Shapiro, G. I.

TITLE: On the problem of residual stress relieving in thermoplastic sheets

SOURCE: Akademiya stroitel'stva i arkhitektury SSSR. Institut sanitarnoy tekhniki. Sbornik trudov, no. 12, 1962. Polimernyye materialy v sanitarnoy tekhnike 122 - 127)

TEXT: Heating of thermoplastic sheets produces conditions which promote the formation of internal stresses and entail corresponding changes in the geometrical dimensions. Tests determining such changes by heating are not included in Soviet standard specifications although they are provided for in the USA (ASTM 702-58) and Japan (II S 6745-1956). The authors studied changes in 3 - 5 mm thick vinyl plastic and organic glass sheets caused by heating at 70 - 140°C of the former and at 80 - 150°C of the latter material. The deformation was measured on graduated specimens with a microscope of 0.005 mm accuracy. The results are represented in relationship curves of the sheet dimensions versus the

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On the problem of residual stress relieving in...

S/867/62/000/012/001/001  
A006/A101

heating time at given temperatures, using mean values of longitudinal and transverse measurements. In heating organic glass sheets stresses arise during heating, independent of the sheet orientation. The same phenomenon is observed in vinyl plastic sheets heated to 140°C; the stresses arise during pressing but not during calendering. The optimum annealing time above which changes in the geometrical dimensions do not take place, is 40 min for 5-mm thick vinyl plastic sheets, heated to 80 - 140°C. At higher temperatures (130 - 140 C) and long lasting annealing it was found that stress relieving was not possible without lamination of the material. The method is proposed for evaluating changes in the geometrical dimensions of annealed thermoplastic sheets. There are 3 figures. ✓

Card 2/2



YEVGRAFOV, N.M.; KRESTAN, N.N.; PLAKSIN, B.V.; SHAPIRO, G.I.

Automation of the painting of gondola cars. Lakokras.mat. i ikh prim. .  
no.2:57-62 '63. (MIRA 16:4)  
(Railroads—Freight cars—Painting) (Automation)

SHAPIRO, G.I.; DANILENKO, L.F.

Possibilities of organizing production-line manufacture of pipe  
lined with thermoplastics. Sbor. trud. NIIST no.12:84-91 '62.  
(MIRA 16:3)

(Thermoplastics) (Pipe)

SHAPIRO, G.I.; BARYSHNIKOVA, A.V.

Reducing the thickness of the plastic layer in pipes lined with  
sheet vinyl plastics. Sbor. trud. NIIST no.12:117-121 '62.  
(MIRA 16:3)

(Pipe, Plastic)

DANILENKO, L.F.; SHATSKOVA, V.A.; SHAPIRO, G.I.

The problem of relieving stresses in sheet thermoplastics. Sbor.  
trud. NIIST no.12:122-127 '62. (MIRA 16:3)  
(Thermoplastics) (Strains and stresses)